# Generation Interconnection

# Combined Feasibility / Impact Study Report

# for

# Queue Project AE2-116

# MIDLAND 23 KV III

# 10.26 MW Capacity / 17.1 MW Energy

July, 2019

# Table of Contents

# 1 Introduction

This Feasibility Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 36.2, as well as the Feasibility Study Agreement between BE-PINE3 LLC, the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is Duquesne Light Company (DL).

# 2 Preface

The intent of the Combined Feasibility/System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the Feasibility Study, but the actual allocation, if any, is included in the System Impact Study.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

The Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs associated with them will be addressed when seeking an Interconnection Agreement as outlined below. Developer will also be responsible for providing and installing metering equipment in compliance with applicable PJM and Transmission Owner standards.

## 3 General

The Interconnection Customer (IC) has proposed a Solar generating facility located in Beaver County, Pennsylvania. The installed facilities will have a total capability of 17.1 MW with 10.26 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is September 1, 2021. This study does not imply a Transmission Owner (TO) commitment to this in-service date.

Final attachment facilities and local upgrades (if required) along with terms and conditions to interconnect AE2-116 will be specified in a separate two party Interconnection Agreement (IA) between DL and the Interconnection Customer as this project is considered FERC non-jurisdictional per the PJM Open Access Transmission Tariff (OATT).

From the transmission perspective, no network impacts were identified as detailed in the "Network Impacts" section below.

| Queue Number | AE2-116 |
|---|---|
| Project Name | MIDLAND 23 KV II |
| Interconnection Customer | BE-PINE3 LLC |
| State | PA |
| County | Beaver |
| Transmission Owner | DL |
| MFO | 17.1 |
| MWE | 17.1 |
| MWC | 10.26 |
| Fuel | Solar |
| Basecase Study Year | 2022 |

## 4 Point of Interconnection

AE2-116 will interconnect with the DL distribution system at the Midland substation off of the Midland-Hookstown 23 kV circuit T22870. See Attachment 1 for the One Line Diagram.

## 5 Transmission Owner Scope/Cost/Schedule Summary

Scope, cost and schedule for the final attachment facilities and local upgrades (if required) to interconnect AE2-116 will be specified in a separate two party Interconnection Agreement (IA) between DL and the Interconnection Customer as this project is considered FERC non-jurisdictional per the PJM Open Access Transmission Tariff (OATT).

From the transmission perspective, no network impacts were identified as detailed in the "Network Impacts" section below.

## 6 Interconnection Customer Requirements

Duquesne Light Company's "Facility Interconnection Requirements" document dated 12/30/2015:

http://www.pjm.com/planning/design-engineering/to-tech-standards/private-duquesne.aspx

## 7 Power Factor Requirements

Interconnection Customer shall design its generation facility to operate at unity power factor with a power inverter capable of varying its power factor from 0.95 leading to 0.95 lagging measured at the high side of the facility substation transformers.

# 8 Revenue Metering and SCADA Requirements

## 8.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 8 of Attachment O.

## 8.2 DL Requirements

The Transmission Owner will install, own and maintain the metering equipment at the Point of Interconnection (See Attachment 1). The IC's facility shall be independently metered, and the IC shall provide the communication link required to send the Revenue Metering and real time data directly to PJM. All costs associated with the installation and maintenance of the metering equipment (including upgrades) shall be the responsibility of the IC.

## 9 Network Impacts

The Queue Project AE2-116 was evaluated as a 17.1 MW (Capacity 10.3 MW) injection at the Midland 138 kV substation in the DL area. Project AE2-116 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE2-116 was studied with a commercial probability of 100%. Potential network impacts were as follows:

# Summer Peak Load Flow

## 10 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

## 11 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

None

## 12 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

None

## 13 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

None

## 14 Steady State Voltage Requirements

None

## 15 Stability

Not required for this project.

## 16 System Reinforcements:

None

## 17 Light Load Analysis

Not required for solar projects.

## 18 Flow Gate Details

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact. It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

None

# Affected Systems

# 19 Affected Systems

## 19.1 LG&E

None

## 19.2 MISO

None

## 19.3 TVA

None

## 19.4 Duke Energy Progress

None

## 19.5 NYISO

None

# Short Circuit

## 20 Short Circuit

The following Breakers are overduty:

None

## 21 Attachment 1: One Line